

U.S.S.N. 10/719,550

Claim Amendments

Please amend claims 13, 21, 23, and 24 as follows:

U.S.S.N. 10/719,550

Listing of Claims

1. (previously presented) A process for removing oxidized metal residues from a metal structure, comprising the steps of:

providing a metal layer;

planarizing the metal layer to form a metal plug structure to leave metal residues on said metal plug structure;

providing an oxidant solution;

heating said oxidant solution to a temperature of at least about 60 degrees C; and

applying said oxidant solution to the metal plug structure to remove said metal residues comprising oxidized metal.

2. (original) The process of claim 1 wherein said oxidant solution comprises hydroxylamine.

3. (original) The process of claim 1 wherein said applying said

U.S.S.N. 10/719,550

oxidant solution to the structure comprises spraying said oxidant solution onto the structure.

4. cancelled.

5. (original) The process of claim 1 wherein said heating said oxidant solution to a temperature of at least about 60 degrees C comprises heating said oxidant solution to a temperature of from about 60 degrees C to about 80 degrees C.

6. cancelled.

7. (original) The process of claim 5 wherein said applying said oxidant solution to the structure comprises spraying said oxidant solution onto the structure.

8. cancelled.

9. (previously presented) A process for removing tungsten residues from a tungsten plug structure, comprising the steps of:

providing a tungsten plug structure formed by a planarization process to form tungsten residues on said tungsten

U.S.S.N. 10/719,550

plug structure;

providing an oxidant solution; and

applying said oxidant solution to the tungsten plug structure remove said tungsten residues comprising oxidized tungsten.

10. (original) The process of claim 9 wherein said oxidant solution comprises hydroxylamine.

11. (original) The process of claim 9 wherein said applying said oxidant solution to the structure comprises spraying said oxidant solution onto the structure.

12. (original) The process of claim 9 further comprising the step of heating said oxidant solution to a temperature of at least about 60 degrees C prior to said applying said oxidant solution to the tungsten plug structure.

13. (currently amended) A process for removing residues from a tungsten plug structure having at least one tungsten plug and a tungsten layer, comprising the steps of:

U.S.S.N. 10/719,550

providing a tungsten layer overlying a dielectric layer to fill an opening formed in the dielectric layer;

etching said tungsten layer in a tungsten etchback process without photoresist present to form a tungsten plug structure comprising tungsten residues on said tungsten plug structure;

providing an oxidant solution; and

removing the tungsten residues from the tungsten plug structure by applying said oxidant solution to the tungsten plug structure to remove said tungsten residues comprising oxidized tungsten.

14. (original) The process of claim 13 wherein said oxidant solution comprises hydroxylamine.

15. (original) The process of claim 13 wherein said applying said oxidant solution to the tungsten plug structure comprises spraying said oxidant solution onto the tungsten plug structure.

U.S.S.N. 10/719,550

16. cancelled

17. (original) The process of claim 13 further comprising the step of heating said oxidant solution to a temperature of at least about 60 degrees C prior to said applying said oxidant solution to the tungsten plug structure.

18. cancelled

19. (original) The process of claim 17 wherein said applying said oxidant solution to the tungsten plug structure comprises spraying said oxidant solution onto the tungsten plug structure.

20. cancelled

21. (currently amended) The process of claim 2, wherein the oxidant solution further comprises at least one alkanolamine monoethanolamine and monoisopropanolamine.

22. (previously presented) The process of claim 21, wherein the oxidant solution further comprises catechol.

23. (currently amended) The process of claim 22, wherein the

U.S.S.N. 10/719,550

oxidant solution further comprises d[[y]]glycolamine and gallic acid.

24. (currently amended) The process of claim 14, wherein the oxidant solution further comprises[,]] ~~one or more alkanolamines~~ monoethanolamine, monoisopropanolamine, and catechol.

25. (previously presented) The process of claim 13, wherein said tungsten etchback process comprises a first tungsten etching step at a first etching rate followed by a second tungsten etching step at a second etching rate less than the first etching rate to expose an underlying barrier layer.